



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Meagan A. Armenta	Project Number J2201
Project Title Catchers Are Protected Behind Home Plate... or Are They?	
Abstract Objectives/Goals my objective was to learn wether a smaller and less expensive chest protector protects a softball catcher's sternum equally the same as a larger and more expensive chest protector. Methods/Materials I used nine pieces of plywood and nine pieces of drywall. A JUG pitching machine, fifty softballs, a Wilson Hinge Fx chest protector, an Easton Black Magic chest protector, and a TAG Battle Gear chest protector. A punching bag to simulate a thirteen year old girl's body. I tapped the piece of plywood to the punching bag and placed the chest protector over the wood. Then I shot softballs at the protectors from 12.2m away at 80.5kmph 50 times. Then I checked to see if there was any indentation. i did this same procedure for the dry wall. I tested this three times for each chest protector. I also passed out a questionairre to all of the coaches of Navajo Girls Fastpitch Softball League. Results I found that the TAG Battle Gear (which was the smallest and least expensive chest protector) protected the catchers sternum euqally the same as the Wilson Hinge FX(which was the largest and most expensive chest protector. I found that the measurements of the indentaions were almost exact. These results supported my hypothesis. In my questionairre, I found that 73% of the caoches believed that a smaller and less expensive chest protector would not protect a catchers sternum equally the same as a larger and mor expensive chest protector, 24% belived that the smaller chest protector would protect a catchers sternum equally the same as a larger and more expensive chest protector, and 3% did not know. Conclusions/Discussion After all my tests and all the results, my hypothesis was supported. This can help the consumers whom which buy this equiptment, afford this equiptment for an athlete at full protection at a reasonable price. This helps my understand this category.	
Summary Statement In my project i wanted to find out wether an athlete is fully protected regardless of the expense.	
Help Received My father helped me with my graphs and with my procedure.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Armen S. Arslanian	Project Number J2202
Project Title Birch Hardwood vs. Particle Board/MDF?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to prove that Birch Hardwood is stronger than Particle Board composite wood and MDF composite wood.</p> <p>Methods/Materials An experiment was designed, consisting of two tests, Torsional Resistance and Cantilever Deflection. In the Torsional Test, the angle and force at which the wood was broken was measured, while in the Cantilever Deflection, the length of deflection and the amount of force which caused the wood to be broken were measured. Both tests relied on an experimental setup consisting of test bars and a clamp that held the wood samples, which broke according to the amount of force applied, measured by the spring balance(s).</p> <p>Results The data for both tests indicated the same result that Birch Hardwood is stronger, requiring more force to break.</p> <p>Conclusions/Discussion Anything using Birch Hardwood would be stronger and less likely to break. Solid wood is more homogeneous and therefore has higher resistance to torsion and deflection. A factor that could have affected my results is the fact that the Particle Board composite wood and the MDF composite wood are not uniform. Therefore this is why there were different results for different test bars of the same Particle Board and MDF composite woods. To improve this project, a mechanism should be added to the Deflection test to enable pulling the stainless steel wire with maximum force of 70 kg.</p>	
Summary Statement Birch Hardwood is stronger than Particle Board and MDF composite woods.	
Help Received Dad helped with the setup.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Shreya Banerjee	Project Number J2203
Project Title Beware of Saturated Fats	
Abstract Objectives/Goals In the project, different cooking oils were tested to see which one had the most saturated fat. Methods/Materials Four test tubes were filled with 20ml. of vegetable oil and one drop of tincture of iodine was added to three test tubes and the fourth test tube was left as control. These four test tubes were heated in a water bath. If the test tubes with tincture of iodine did not change color, another drop of iodine was added and the test tubes were heated again. This process of heating and adding was continued until the oil (in the three test tubes) changed color and the drops of tincture of iodine were recorded. The experiment was repeated for olive, sunflower, grapeseed, canola, mustard, almond, peanut, and coconut oil. The oil that needed the least number of tincture of iodine drops was the most saturated. Saturated fats are unhealthy and can cause heart attack and stroke. Results Sunflower oil was the least saturated and coconut, peanut, and almond oil were the most saturated. Conclusions/Discussion Saturated fats are unhealthy and can cause heart attack and stroke. Sunflower, vegetable and canola oil are recommended for regular cooking. Olive oil is also healthy because it has high amount of monounsaturated fat and antioxidants. Coconut oil is unhealthy.	
Summary Statement In my project, I found which cooking oil has the most saturated fat and what saturated fat does to your heart.	
Help Received Mother helped with project. Dr. Anupom Ganguli (scientist), my father (cardiologist), and my mother supervised the project	



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

Name(s) Samantha Jean Beckett	Project Number J2204
Project Title The Effect of Light Bulb Type on Energy Consumption, Brightness of Light Emitted, Heat Output, and Operational Cost	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this investigation is to discover which energy efficient light bulb is the most suitable replacement for a standard household 60-watt incandescent light bulb.</p> <p>Methods/Materials Materials collected for this experiment were (12) 60-watt equivalent light bulb test samples, photographic light meter (w/incident and spot meter attachments), ATD-701 Infrared Thermometer, Kill-A-Watt energy consumption monitor, and analog dial thermometer. A controlled environment test box was constructed to contain the light and heat emitted from the light bulbs. It was created from six pieces of black foam core, a coat hanger, two Styrofoam plates, and black duct tape. The Styrofoam plates hung from a coat hanger in the middle of the box, directly in front of the light bulb. This was used when determining the indirect brightness of the light emitted from each bulb. Each sample was tested individually for a period of 40 minutes for direct and indirect brightness, energy consumption, and heat output. Annual operational cost was calculated using the current average kWh rate provided by PG&E.</p> <p>Results The results of the data collected showed that the Seesmart Household LED used the least amount of energy at 4.5 watts, which was less than one-tenth the energy needed to illuminate an incandescent light bulb. The charted data proved the Evolux (Cool White) LED to be the brightest light bulb, when tested both for indirect and direct luminosity. The heat output testing proved that the Evolux (Warm White) LED was the coolest, reaching 91.2°F after thirty minutes. Finally, the Seesmart Household LED resulted in being the least expensive to use for 8 hours each day over the course of a year, costing only \$2.31 per year.</p> <p>Conclusions/Discussion Much was learned from this experiment. LEDs and CFLs can save electricity, as well as money. Although LEDs prevailed in all tests, it is necessary to note that there is not one clear winner. Halogen bulbs, though comparable to incandescents, reached the highest temperature of all the bulbs tested. LEDs and CFLs do not get as hot and have lower energy consumption requirements, making them a viable alternative for incandescent light bulbs. Ultimately, although there is no single winner, with all the energy efficient bulbs on the market, there is little reason to use a standard 60-watt incandescent. Reducing your carbon footprint is as simple as changing a light bulb.</p>	
Summary Statement Testing new forms of light bulbs, to find a suitable and energy efficient replacement for the 60-watt incandescent household light bulb.	
Help Received Father let me borrow his light meter and taught me how to use it; Mother purchased a digital thermometer, printer paper and ink.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jessica T. Brennan	Project Number J2205
Project Title UV Protective vs. Ordinary Fabrics: Effectiveness Before and After Washing	
Abstract Objectives/Goals I enjoy hiking and the outdoors. At a store I noticed clothing that carried a UV protective label. I thought about a friend who had been sunburned under an ordinary t-shirt. The damaging effects of UV light are well known. I was curious to discover if UV protective fabric would truly provide additional protection against UV radiation when compared to ordinary fabric. I also wondered whether the fabrics, when washed, would maintain their effectiveness in blocking ultraviolet radiation. I hypothesized that UV protective fabric would protect bacteria from UV light better than ordinary fabric, and that washing would have a negative effect on a fabric's ability to block UV light. Methods/Materials This experiment consisted of two parts, both of which examined the effects of ultraviolet light on <i>Serratia marcescens</i> bacteria. The first part of the experiment examined the effectiveness of UV protective versus ordinary fabric by testing the bacteria's viability after exposure to UVA or UVC light for varying lengths of time when shielded by a fabric sample. The second part of this experiment was carried out in the same manner, but used only a UVC lamp and examined the effects of washing on the two types of fabrics. Results Since the UV protective fabric is intended to block UVA and UVB light, a UVA light was tested in this experiment. Unfortunately, the UVA light didn't seem to have any consistent effect on bacterial growth even after prolonged exposures. Tests with the UVA light could not accurately measure information about the fabrics' protectiveness. However, the UVC tests in both the first and second experiment showed that the UV protective fabric did block the UVC light significantly better than ordinary fabric. Surprisingly, washing appeared to actually improve the protective effects of the UV blocking fabric. The results of washing were inconclusive for the ordinary fabric. Conclusions/Discussion UV protective fabric appeared to block UV rays better than ordinary fabric. Its effectiveness in blocking UV rays seemed to improve with washing even after the fabric was washed up to seventeen times. From the results of this experiment, it appears that wearing UV protective fabric may be of benefit in reducing exposure to UV light.	
Summary Statement The goal of this project was to discover whether UV protective fabric would block UVC rays more effectively than ordinary fabric and whether the protective effect might diminish with the washing of the garment.	
Help Received Mother helped with pipetting bacteria. Advisor provided lab space and UVA bulb and fixture. Mother and advisor supervised use of UV lights.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Sebastian D. Carrasco	Project Number J2206
Project Title A Sticky Issue: A Comparison between Different Rosins and Volume Produced	
Abstract Objectives/Goals Being a violin player, I was interested in finding if different violin rosins would actually help make a louder sound. Methods/Materials The materials used in this project were: my violin and bow, six different rosins, a decibel meter, a metronome/tuner, measuring tape, rubbing alcohol, cleaning materials, and masking tape. I found and taped off a section of my bow where I could produce the loudest continuous violin sound and used a metronome to make sure I was moving the bow at a consistent speed. I tested six different rosins on sample notes in three different ranges of the violin register (B flat on the G string, F# on the A string, and high F# on the E string) and measured the highest consistent reading a decibel meter would give. I also tested as a control, no rosin before each rosin test. Results I was surprised to find that the maximum volume each rosin could produce on the E string note varied from 90 decibels to 97 decibels, on the A string the levels varied from to 91 decibels to 94 decibels, but that all rosins produced a similar maximum volume to no rosin on the G string note. (90 decibels). The rosin that could produce the loudest sound on the E string was the fifth loudest on the A string. Conclusions/Discussion Different rosins seem to each have different effectiveness on different strings and frequencies. The G string, which is the lowest string on the violin did not respond very differently to different rosins. I would like to expand this study to include all four strings and also repeat the procedure using a cello.	
Summary Statement Testing different rosins to find which produces the loudest sound on the violin.	
Help Received My dad bought me a decibel meter. My mom helped clean my violin strings and bow between rosin tests and helped me stay the right distance from the decibel meter while I was playing.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jonathan T. Chaney	Project Number J2207
Project Title Compact Fluorescent Lights vs. Incandescent Lights	
Abstract Objectives/Goals My goal was to determine if compact fluorescent light bulbs were more efficient than their equivalent incandescent light bulbs. I did this by measuring the light output, the power used, and the operating temperature of each type of light bulb. Methods/Materials I compared 5 compact fluorescent light bulbs to 5 incandescent light bulbs by using a voltmeter and photocell to measure light output, a wattmeter to measure the power used, and an electronic thermometer to measure the temperature of each bulb. In order to keep my tests consistent, I built a light proof box to hold the test instruments while doing the experiment. Results I determined that compact fluorescent light bulbs used about 75 percent less power, put out almost the same amount of light, and generated 30 degrees Fahrenheit less heat than the incandescent light bulbs. Conclusions/Discussion I concluded that compact fluorescent light bulbs are more efficient than incandescent light bulbs.	
Summary Statement I wanted to determine if the compact fluorescent light bulb commercials were correct about them being more efficient than incandescent light bulbs.	
Help Received Dad helped me build the light proof box. Mom helped edit the report.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Steven L. Delcarson	Project Number J2208
Project Title The Best Insulation	
Abstract Objectives/Goals Would you like to know what the best insulation is for building a house that conserves energy? Well that is what I have been testing for the past months to figure out. I believe that this project can help and prove to builders the best insulation for houses. Methods/Materials To begin my experiment I had to buy all the materials that were needed for the project. I bought most items such as wood, insulation, and dry wall at Home Depot and Lowes. Then I went to a hardware store and bought the right types of nail. To start the boxes we made three boxes out of wood with thin rectangular frames inside. I then put fiberglass and foamed plastic in two different boxes and left the other empty. I finally put dry wall walls inside of the creating a small house with insulation at the top also. After a few days of hard work I was ready to test. Results After I finally finished testing I got my answer. The winner of the best insulation/energy saver was the fiberglass with a drop of 8.8 degrees Celsius, followed by the foamed plastic with a drop of 10.2 degrees Celsius. The worst insulation was the spray foam which dropped 10.6 degrees because of an error of the generator possibly making the freezer cold. In last was the empty control with a 15.7 degrees drop. Conclusions/Discussion This experiment's results have shown me and will show others what truly is the best insulation. Builders can now create more energy saving houses when they identify that fiberglass is the best. To finish off my experiment I will write my written report and my create my poster to state the best insulation. So, I realize that I was wrong in my hypothesis but, have learned one of the key points to house building and saving energy to keep warm. Fiberglass insulation!	
Summary Statement I built three boxes with different insulations and tested each of them in the freezer for an hour to see the greatest and lowest temperature decrease.	
Help Received Teacher Ms. Reichelt was my mentor throughout the project, my dad helped me with creating the boxes and touch-ups on the board, and my uncle helped me decide my project.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Lily Denesha	Project Number J2209
Project Title It's Shocking!	
Abstract Objectives/Goals The object of this project is to determine how well commercial tennis racket shock absorbers work. Methods/Materials Tennis racket handle vibrations were measured by affixing a pen as a stylus to the racket grip and clamping the racket to a fixed object so that it vibrated when impacted by a dropped tennis ball. Transparency paper was positioned against the pen so that a line was scribed on the transparency that was determined to be proportional to the vibration. Ten tests were made with and without the shock absorbers to determine their effectiveness in low velocity impacts. Higher velocity tests were made using a "tennis cannon" that achieved tennis professional level ball velocities over 100 mph. A "homemade" non commercial shock absorber was also tested to see how big an absorber had to be to provide a significant shock reduction benefit. Results A 0.656% vibration reduction was measured in the low ball velocity tests. Results of high ball velocity testing are pending. Results of large absorber testing are also pending. Conclusions/Discussion Tennis racket shock absorbers are popular accessories in nearly all tennis circles. They are small, inexpensive (most are less than \$2.00), plastic or rubber devices slightly larger than a thumbnail. They are placed the strings of the racket near the base of the face to provide sound and vibration dampening. Inventors of these devices claim reductions in vibration and noise but offer little or no science to prove the extent of these reductions. My conclusion is that commercial tennis racket shock absorbers provide minimal benefit in low velocity impacts. Since the cost is low and there may be other benefits besides those that are measured (such as noise reduction and placebo effects) they are probably worth putting on a racket. The small gain may also become significant over time considering the cumulative effects of hundreds or thousands of impacts to the "tennis elbow" and other parts of the body. Conclusions regarding reducing vibration in higher velocity impacts are pending current testing with a recently constructed "tennis cannon."	
Summary Statement The object of this project is to determine how well commercial tennis racket shock absorbers work.	
Help Received Father helped setup the measuring stick and construction of the "Tennis ball Cannon"	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Matthew Descala; Ricky Mattus	Project Number J2210
Project Title Guitar Comparisons: Are the More Expensive Guitars Really Better than the Less Expensive Guitars?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine if the quality of the guitar (where manufactured, type of materials used) is directly related to the cost of the guitar?</p> <p>Methods/Materials Experimental method: All guitars were recorded in the same key. All recordings were done exactly the same. The recordings were measured for volume and decibel range by a computer program call Audacity. The recordings were then played to a sample of people, most of which had a musical background. This was a blind study and the people surveyed had to rate the recordings for clarity, volume, sound quality and their overall preference of guitar.</p> <p>Results The results of the blind study were combined and plotted on a bar graph. Then an average of the results for each item measured was charted for comparison. It was concluded from the blind survey that where the guitar was made, what material it was made of and the price of the guitar did have a direct correlation to the quality of sound, volume, and clarity. See attached chart It was also concluded that the computer program Audacity results were almost identical to the blind study results, which supports the hypothesis that the quality of sound, materials and manufacturing directly correlate to the manufacturers suggested price of the guitar.</p> <p>Conclusions/Discussion The significant results were that both the computer program Audacity and the blind survey of musicians supported the hypothesis. The most expensive guitar had the best sound and decibel levels in the program Audacity. The most expensive guitar was preferred by greater than 70% of the people surveyed. The average ratings for sound quality, clarity, volume was best with the most expensive guitar. The other guitar ranked nearly identical with the price of the guitar. The findings show that the quality of wood and manufacturing of guitars and the price of guitars is directly related to the sound quality.</p>	
Summary Statement Comparing the sound quality of guitars based upon materials used and price of the guitars.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Rachel B. Dobrin	Project Number J2211
Project Title Can You Discern How Much Your Skin Burns?	
Objectives/Goals My goal is to see if SPF in sunscreen has the protection on your skin it says it does and to see which sunscreen out of three well known brands is the best; Banana Boat, Coppertone, or Neutrogena.	
Abstract Methods/Materials Materials: # 3 bottles of Neutrogena sunscreen, one SPF 15, one SPF 30, and one SPF 45 # 3 bottles of Coppertone sunscreen, one SPF 15, one SPF 30, and one SPF 45 # 3 bottles of Banana Boat sunscreen, one SPF 15, one SPF 30, and one SPF 45 # A UV monitor # Plastic wrap # A sunny day Methods: 1. Rip off a piece of plastic wrap and place it on the UV monitor. 2. Go outside with the monitor and hold it up to the sun for ten minutes. 3. Record the reading from the monitor. 4. Do the same thing with the plastic wrap and UV monitor, but put a thin coating of sunscreen on wrap. 5. Subtract the blank plastic wrap reading from the sunscreen reading, which shows how much the sunscreen reduced the UV radiation. 6. Do the same thing for all the sunscreens. 7. Do each individual sunscreen three times each on the monitor, and then find the average of the three numbers. 8. Record to see the UV light that reduced for each SPF. Results The SPF in the sunscreen did have the protection level it said and the sunscreen that blocked the most Ultra Violet rays was Neutrogena SPF 45. Conclusions/Discussion Overall, my hypothesis was correct. The sunscreens were true to their claims as i expected and the Neutrogena SPF 45 sunscreen was the best. Based on my information, I can conclude that if you wear sunscreen, you will have a longer and happier life and won't get diseases involving the sun and its rays.	
Summary Statement My project is about the various SPFs in sunscreens and whether the protection level of the sunscreens is accurate.	
Help Received Mother helped me with procedures; Dr. X helped me improve my project greatly; Mrs. Y helped me write my report.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Erynne Veda Estoesta; Samantha Michal Johnson	Project Number J2212
Project Title Soda Lightful!	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective in our project is to determine what brand of coke decays your teeth the most.</p> <p>Methods/Materials Five different coke brands that are the same size and five human teeth that are from same person and are the same type of teeth. Palce teeth in five different glasses that are all transparent and pour each coke in a different glass. Take the teeth out and weigh daily with a scale that weighs milligrams. After one full week take the teeth out and record the final weight.</p> <p>Results The glass with the regular coke lost the most weight. It started with .74 milligrams and ended at .55 milligrams.</p> <p>Conclusions/Discussion My conclusion is tha due to the fact that the regular coke has more sugar and acids it decayed the teeth more than the other brands.</p>	
Summary Statement We will prve which coke brand will decay your teeth the most .	
Help Received Father got a scale that weighd milligrams.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Kellie O. Foltz	Project Number J2213
Project Title Determining The Combustibility of Household Paints	
Abstract Objectives/Goals What types of paints would be best used on a home from preventing combustibility? Methods/Materials Procedure: 1. Paint craft sticks with 4 selected paints 2. Let craft sticks dry for 24 hours 3. Ignite the torch 4. Clamp the wood on the apparatus 5. Turn the stop watch on, wait patiently for the wood to combust 6. End the stop watch when the craft stick starts to combust 7. Record observation/information Materials: 1. Birch craft sticks 6"x3/4"x1/16" 2. Exterior semi-gloss house paint Exterior flat house paint 3. Interior semi-gloss house paint 4. Interior flat house paint 5. paint brush 6.stop watch 7. Oxy-acetylene torch 8. Testing apparatus 9. Black marker 10. Cardboard 11. Clamps 12. Screwdriver Results The Exterior semi-gloss combusted, on average, 60 seconds slower than the Interior semi-gloss. The Interior semi-gloss combusted faster than the Exterior semi-gloss, the average time was 3:21 minutes. The Exterior flat was faster than Interior flat to combust. The average time for Interior flat was 2:18 minutes. The plain craft sticks burned the fastest, the average time was 1:03 minutes. Conclusions/Discussion After completing my investigation I found that my hypothesis was incorrect for semi-gloss and my hypothesis for flat household paint was incorrect also. My original hypothesis for combustibility stated that semi-gloss paint has more oil and I thought oils catch on fire quick. My hypothesis for the flat household paint was that it would take longer to combust than the semi-gloss. My hypothesis for Exterior flat was incorrect. The lowest: 0:36. The highest: 2:15. Out of the 15 trials. Interior flat worked best out of the 15 trials I tested. My hypothesis for Interior flat was incorrect. Interior flats lowest time was 1:31 and the highest was 2:51 out of the 15 trials I tested. My hypothesis for Exterior semi-gloss was incorrect. The lowest: 3:00. highest: 6:01. Out of the 15 trials I tested. Exterior semi-gloss was best from out of all 5 variables. Paint tested was light based. My hypothesis for the Interior semi-gloss was incorrect. Interior glosses lowest: 2:00. Highest: 4:03. I learned that the Exterior semi-gloss is the least flammable and that the Exterior flat was the most flammable. Also I learned by putting paint on wood prevents the combustion on homes.	
Summary Statement Determining the combustibility of household paints.	
Help Received My older brother supervised testing; Mother helped with supplies.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jordan J. Francis	Project Number J2214
Project Title We Can Stop the Fire!	
Objectives/Goals The objective was to find the most effective way to protect a home from fire damage. It was hypothesized that Barricade Fire Retardant Gel would be most effective in protecting a home from fire damage.	
Abstract	
Methods/Materials Method: (1) Get an adult to supervise tests (2) Apply fire retardants and let samples cure if required (3) Gather all materials and keep safety equipment at hand (4) Weigh wood sample (5) Clamp sample in place (6) Position propane torch 3" below sample (7) Ignite torch and allow sample to burn at 1500 degrees Fahrenheit for 1 minute (8) Remove torch (9) Use timer to record time sample continues to burn until flame dies out naturally (10) Remove sample from clamp (11) Weigh sample (12) Repeat with all 120 wood samples and retardants Materials: 20 Cherry wood samples, 4" in length; 20 Maple wood samples, 4" in length; 20 Oak wood samples, 4" in length; 20 Pine wood samples, 4" in length; 20 Redwood samples, 4" in length; 20 Teak wood samples, 4" in length; 18 Fire retardant samples; Latex paint / stain, foam brushes; Digital weighing scale; Timer; 2 Propane burners, Butane lighter; 2 Metal stands with clamping mechanisms; 1 Thermal probe; Tongs, goggles, face mask, gloves; 1 Class-A fire extinguisher; 1 Bucket of water	
Results A majority of fire retardants that had to be mixed with paints or stains did not protect wood from being burnt significantly. However, some fire retardants that were used as a direct shield from oncoming fire, left the wood with most of the material intact, and often prevented combustion altogether. Redwood and Pine were most receptive to the retardants, while Oak and Maple were most combustible, despite treatment.	
Conclusions/Discussion It was concluded that FlameStop Intumescent Paint was the best preventative fire retardant. Barricade Fire Blocking Gel was found to be the best protective fire retardant. VE-231 paint additive was discovered to be the least effective fire retardant. Through the course of the testing, it was also discovered that softwoods like Pine and Redwood are much more receptive to absorbing fire retardants than hardwoods like Oak and Cherry, and therefore, easier to protect from wildfire. In addition, it was discovered that Teak burned with a flame that did not easily self-extinguish. This was due to its high oil content that continued to provide fuel to sustain the fire.	
Summary Statement Testing the most effective way to protect a home from fire damage.	
Help Received Mother helped acquire materials, supervise testing and put together board. Mrs. Williams helped with format of the board.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jase J. Franke	Project Number J2215
Project Title Economic Generic Brands vs. Name Brand Sunscreen	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine which sunscreen and SPF is most effective against UV rays. I will see if Economic Generic Brands or Name Brand sunscreen is more effective against UV rays. I will keep track of percent of UV rays blocked, time began, time ended, and the percentage of UV rays blocked.</p> <p>Methods/Materials I needed 1000 UV beads because I have tested 13 sunscreens at 3 times each for a specific amount of time. I have recorded the time I began from each test and the time ended. For example, SPF 15 was tested for 150 minutes, SPF 30 was tested for 300 minutes, and SPF 50 was tested for 500 minutes. I have also tested Zinc Oxide which was SPF 50 and that was tested for 500 minutes. Those are the maximum strengths of the sunscreens. The sunscreens that I tested for Name Brand sunscreen are Coppertone, Zinc Oxide, and Banana Boat. For Economic Generic Brands I tested Rite Aid and CVS. I used the UV Beads because they are like skin cells and zipper lock bags because they are like skin. Before I test any sunscreen I would put one color of the UV beads in a zipper lock bag. I would use a camera and take pictures in the beginning, middle, and end of the test. That way I am able to see how well the sunscreen is protecting the UV beads. The UV beads are sensitive to UV rays. After I put the beads in the bag, I would set the beads on a paper towel and layer them with sunscreen. I layed the sunscreen indoors so it wouldn't get affected by UV rays. I used a measuring cup to help me make sure that there was an even amount of sunscreen on each zipper lock bag. I then used a timer once I set the sunscreen on a flat surface. When the timer came to a 150 minutes I toke the sunscreen out for SPF 15. And, when the timer hit 300 minutes I took the sunscreen out. And, when the timer hit 500 I was done with the test. I have recorded everthing in my notebook. I figured out the percent of UV rays blocked, SPFs, notes and data.</p> <p>Results I figured out that Name Brand sunscreen is more effective than Economic Generic Brand sunscreen. It is important to always wear the highest possible SPF. UV beads were the best way to test sunscreen.</p> <p>Conclusions/Discussion I can conclude that Name Brand sunscreen is the best to use because it blocks the most UV rays.</p>	
Summary Statement My project is about determining which sunscreen type of Economic brands or Name Brands is most effective against the suns UV rays.	
Help Received My teacher helped me edit my project and my sister helped me with the display board.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Adra M.V. Friedman	Project Number J2216
Project Title The Search for the Ultimate Biscuit	
Abstract Objectives/Goals The objective is to determine how changing the amount and type of baking powder affects the height of biscuits in centimeters. It is hypothesized that 2x the control amount of SAPP baking powder used in biscuits will rise to the greatest height. This is hypothesized because SAPP is double-acting, and this particular variation has double the control amount of baking powder. Methods/Materials A brief procedure of the experiment follows. Sixty-five biscuits were baked, each following the different amounts of baking powder specified in the procedure. They were the control amount (as stated in original recipe), no baking powder, and $A^{1/2}$, $1A^{1/2}$, and 2 times the control amount. There were thirteen different variations, and five trials of each, using three different types of baking powder: SAPP, Tartrate, and SAPP w/ct (SAPP baking powder with added cream of tartar). The height of the biscuits was measured in centimeters once they were fully cooled. Data was taken and recorded. Results The results of the experiment did not support the hypothesis. Although the SAPP baking powder did result in the greatest numbers on average, the control of SAPP rose the greatest, not 2x the amount of SAPP as hypothesized. The control of SAPP rose to a height of 2.86 cm on average while 2x the amount of SAPP only rose to a height of 2.26 cm on average. Conclusions/Discussion The experiment validated that the amount of baking powder specified in the particular recipe used throughout the experiment is the optimal amount to create the greatest rise in the biscuits.	
Summary Statement To determine which type and specific amount of baking powder creates the greatest rise in biscuits, sixty-five biscuits were made and measured in centimeters using three different types of baking powder with multiple variations.	
Help Received Parents bought supplies and helped to sift dry ingredients.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Lindsey B. Gribas	Project Number J2217
Project Title Which Detergent Cleans Best?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to test four brands of detergent to see which cleaned the best. The four brands being tested were Tide, Cheer, Melaleuca and Kirkland (Costco Brand). The hypothesis was that Tide would do the best because its advertisement says it cleans better than clean. It had also won a VIP award. I also wanted to know if it was worth the cost.</p> <p>Methods/Materials Materials: paper, pencil, white cotton material pieces, stains (ink, lipstick, oil, grass and dirt), permanent marker, timer or clock, detergents (Tide, Cheer, Melaleuca and Kirkland), scissors, sink or bucket to wash the material</p> <p>Method: I cut out 40 pieces of white cotton material and put 5 different stains on them. The stains were lipstick, oil, grass, ink and dirt. I then washed each piece for 10 minutes and soaked them for 3 minutes. I did this process twice.</p> <p>Results The results were the same both times. The lipstick did not come out of the material for any of the four detergents, but came out better using Tide and Cheer. The oil did not come out at all with any of the detergents, and none did better. The grass, ink and dirt came out completely with all four detergents. Using the cost of Tide at \$.14 an oz., Cheer at \$.11 an oz., Melaleuca at \$.31 an oz. and the Kirkland brand at \$.09 an oz., you would get the best buy for your money using Costco's Kirkland brand.</p> <p>Conclusions/Discussion The data gathered through this experiment does not support the hypothesis that Tide is the best detergent for getting the five stains out of the cotton material that was used. The data shows that all the brands did essentially the same except for the stain of lipstick. With the stain of lipstick, Tide and Cheer did the best---neither getting it out completely. This data would suggest that you could use any of these detergents and feel confident that they would work for getting out common stains. Therefore, the cheapest brand, Kirkland, would be the best choice for your money. You can not always believe advertisements. Paying more money does not guarantee you better cleaning power.</p>	
Summary Statement Which of these detergents ,Tide, Cheer, Melaleuca and Kirkland , cleans the best for your money?	
Help Received My family helped with typing and advice on my board.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jeremy Hart; Justin Hart	Project Number J2218
Project Title Be Wise, Protect Your Eyes	
Abstract Objectives/Goals The objective of this experiment is to investigate which tint will be most effective in blocking ultraviolet rays in sunglasses. Methods/Materials We obtained two lens materials, Columbia Resin-39 and polycarbonate lens in five common tints (blue, brown, green, grey, and rose) and in two shades (light and dark). We utilized a negative control, a reference control, and a clear lens of each material as a control group. We used the Humphrey Lens Analyzer to measure the percentage of UV B and UV A transmittance. We recorded these results on our data log sheet, and calculated the UV B and UV A that was blocked by the lenses. We performed the trials twice on three different days to verify the accuracy and reliability of our results. Results All the experimental lenses blocked UV B 100%. The top three tints on CR-39 are green, grey and brown, and the darker shades did improve its' performance. In contrast, the polycarbonate lenses in light and dark tints blocked similar amounts (98-100%) of UV A. Conclusions/Discussion Our hypothesis that the grey tint would be most effective in blocking UV rays was proven incorrect. Although the light and dark green tint consistently performed exceptional in both materials, the other four tints exceeded the American National Standards Institute's recommendations. We discovered that the polycarbonate material blocked out most of the UV rays, regardless of tint or shade. The results from this science experiment demonstrated the importance of lens material in UV protection. Based on this study, we must all consider wearing sunglasses to protect our eyes.	
Summary Statement The objective of this experiment is to investigate which tint will be most effective in blocking ultraviolet rays in sunglasses.	
Help Received Tony Jaworski obtained lenses and shared his knowledge of the analyzer. Dr Dao tinted the lenses. Parents supervised & paid for materials.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Ally Howe; Siobhan Rickert	Project Number J2219
Project Title Can Swimmers Buy Speed? How the Swimsuit Impacts the Speed of the Swim	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine if Speedo's technically advanced swimsuits (LZR Racer; Fastskin FS-Pro) give elite swimmers a greater competitive advantage compared to their conventional swimsuits (Endurance+; Aquablade; Fastskin FSII). We selected Speedo over the next largest competitive swimsuit manufacturers (TYR; Nike) for testing because Speedo offers a much broader range of styles, fabrics, and technologies, allowing us to maintain consistency within a brand.</p> <p>Methods/Materials Five Speedo swimsuits--each with distinct features (see project board for specifics) including design, material, and cost--were used to conduct four separate tests to answer the following questions: -WATER RUN-OFF: How much water does each swimsuit resist? -WEIGHT (DRY/WET): How much does each swimsuit weigh dry and wet? How much water did each swimsuit absorb? -PASSIVE DRAG: How far and in what time does an elite swimmer travel when pushing off the wall and gliding through the pool? -SWIMMING: What distance and times does an elite swimmer travel when swimming one lap of freestyle?</p> <p>Results Speedo's technically advanced swimsuits consistently achieved better results in testing compared to their conventional swimsuits: -Technically advanced swimsuits resist more water than conventional swimsuits -Technically advanced swimsuits weigh less and absorb less water than conventional swimsuits -Elite swimmer traveled greater distance in less time when pushing off wall and gliding through water -Elite swimmer swam the same distance in less time wearing technically advanced swimsuits</p> <p>Conclusions/Discussion Speedo's technically advanced swimsuits offer elite swimmers a greater competitive advantage compared to their conventional swimsuits. Technically advanced swimsuits resist more water, weigh less, absorb less water, and allow elite swimmers to travel a greater distance in less time when gliding than conventional swimsuits. Next time, we would use electronic versus hand timing in passive drag and swimming tests to decrease human error. We'd also conduct tests more than 3-5 times to ensure the most accurate results. In addition, it would be interesting for future research to see if different genders, different body types, non-elite swimmers, and swimming a longer distance would produce similar results.</p>	
Summary Statement Our project is about whether Speedo's technically advanced swimsuits (LZR Racer; Fastskin FS-Pro) offer elite swimmers a significant competitive advantage compared to their conventional swimsuits (Endurance+; Aquablade; Fastskin FSII).	
Help Received Both sets of parents provided timing, measuring, photography, equipment, data analysis, and typing assistance.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Joseph C.A. Kost	Project Number J2220
Project Title Beating Duraflame(R): What Kind of Firewood Offers the Best Value?	
Abstract Objectives/Goals The objective is to determine if Duraflame(R) burns the longest, generates the most heat and provides the best firewood value. Methods/Materials Samples of five different wood types of equal mass and approximately the same size were burned using denatured alcohol as a fire starter. The heat produced by each sample was determined indirectly by measuring the mass of water evaporated from a container placed directly above the fire. As the water boiled on each trial, the heat produced was proportional to the water evaporated. The cost per gram of each wood sample was determined from the best prices available locally or online. The best heating value was determined by dividing the heat produced by the sample cost. Results Duraflame(R) burned the longest and provided the most heat, but was second to worst in heating value. Seasoned Oak provided the best heating value of the five wood types tested. Conclusions/Discussion Each wood type tested had different heat production and burning rates. The heat generated differed between samples of the same wood type. This showed that uncontrolled factors such as wood moisture content, sample density and geometry, completeness of combustion, outdoor wind speed, water temperature and air temperature influenced the test results. Duraflame(R) burned the longest and provided the most heat, but performed second to worst in heating value, due primarily to its high cost compared to the other wood types. Seasoned Oak provided the best heating value of the five wood types tested.	
Summary Statement The purpose of this experiment is to find out whether any firewood is more cost-effective for heating than Duraflame(R) and which firewood generates the most heat for a given mass.	
Help Received My father supervised the experiment at our home and assisted in putting the boards together. My mother helped type my report. My brother, Jordan, took pictures of me conducting the experiment. My science teacher, Miss Amber Baranowski, and Doctor Gerald Oliver reviewed my drafts and offered advice.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Michelle M. Lin	Project Number J2221
Project Title Fiddling with Friction: A Test of 15 Rosins	
Abstract Objectives/Goals The purpose of rosin is to increase the amount of friction between the bow and a string on a stringed-instrument. Rosins are made mostly from the resins of trees, but sometimes other materials, such as gold or silver, are added to set-up even more friction. The purpose of this experiment will test a variety of rosins to discover which brand produces the most friction on a bow hair. Such information may be useful to stringed instrument players in selecting rosin. Methods/Materials A bow hair suspension device was designed and constructed to measure changes in friction due to rosin on single bow hairs. With the device, the rate at which a light weight (small paper card) slid down (due to gravity) a single horse hair was measured, before and after rosin. A stop watch was used to measure the time of travel. More than 660 measurements were made, and the data were analyzed statistically (t-test). Fifteen different commercially available rosins for the various stringed instruments (violin, viola, cello, and double bass) were tested. Results Seven of the rosins increased the slide time by more ten percent ($P < 0.003$). The rosin with the greatest increase in slide time was Pops# Bass Rosin (ratio = 1.88). For all-purpose rosins, the rosin with the highest ratio was D#Addario Light. For violin/viola rosins, it was William Salchow. Hidersine had the highest ratio of the cello rosins. Conclusions/Discussion A potential source of error was the measurement of the slide time (1-2 seconds). However, errors in measurement of the slide time may have been relatively small, because ratios of slide times #with# rosin to slide times without rosin were fairly close to 1 for the controls (range, 0.94-1.04). Another possible limitation was applying different amounts of rosin to each hair, as the rosin was applied by hand. Some of the rosins may require different amounts of pressure to generate their full stickiness. However, a more precise way to apply the rosin could not be found for this project. Finally, friction (stickiness) is not the only quality that musicians consider when selecting rosins. Surface noise, tone, and dust generated are also important, which is why price does not correspond with stickiness. Although the cheaper rosins create more friction, they may not do as well in other categories.	
Summary Statement The purpose of this project is to test a number of different stringed instrument rosins and discover which variety produces the most friction on a bow hair.	
Help Received Father gave advice and minimal assistance assembling display board	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Cody D. Lo	Project Number J2222
Project Title Will You Miss the World with Colored Contact Lenses?	
Abstract Objectives/Goals Many teenagers today like to wear color contacts to change their eye color. Do color contacts make them see clearly especially on their peripheral field? Will it block their peripheral vision? Methods/Materials Test subjects will first have their peripheral vision tested without any contact lenses on the Humphrey peripheral field testing machine as controls. Then test subjects will wear a clear contact lens on their right eye and will be tested on the machine again. Test subjects will lastly test their peripheral vision with a color contact on the right eye with the same machine. All three peripheral vision tests will be compared to reach the conclusion. The materials used in this experiment were clear contacts, color contacts, Humphrey Peripheral Field Testing Machine, contact lens cleansing solution, contact lens cases, and eye patches. Results The average maximum peripheral vision on the Humphrey 68 point peripheral field test was 64.35 points. The clear contact lens test subjects scored an average of 60.24 points. The color contact lens test subjects scored an average of 55.05 points. When wearing no contact lenses, test subjects missed about 4% of their maximum peripheral vision. The clear contact lenses wearing subjects missed on average 10 % of their maximum peripheral vision. The color contact lenses wearing subjects missed on average 18 % of their maximum peripheral vision. Conclusions/Discussion Obviously, testing without wearing any type of contact lenses was the test subject#s maximum ability to see peripherally and that while wearing clear contact lenses, his or her peripheral vision decreased slightly. The test subjects peripheral vision decreased the most while wearing a color contact lens. Color contact lenses block peripheral vision. During the testing, many patients said that their vision became blurry when looking through the side of their eye.	
Summary Statement The purpose of my experiment is to discover if color contact lenses block peripheral vision.	
Help Received My father helped me with the board. Dr. Garlan Lo provided the necessary instruments for conducting my experiment.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Nicholas J. Mah	Project Number J2223
Project Title Which Sunscreen Protects the Most?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to investigate if there are differences in protection against Ultraviolet (UV) rays in sunscreens. I believe that Coppertone Sport SPF 50 would give the best protection.</p> <p>Methods/Materials Six different brands of sunscreens were selected. Each sunscreen was tested at set times, dates, and at the same location. The testing was repeated for five consecutive days. An UV monitor was used to measure the UV level.</p> <p>Results The results of this project were very surprising. It was Banana Boat Sport SPF 50, Hawaiian Tropic Sheer Touch SPF 50, and Walgreens with Parsol 1789 SPF 50 that provided the most protection. The UV levels were 0 for all the times and days of testing for those three sunscreens. The Huggies Little Swimmers SPF 50 had one bad reading while, Coppertone Sport SPF 50 and Pacific Sun Sport SPF 50 (Longs brand) consistently performed the worst.</p> <p>Conclusions/Discussion Unlike the hypothesis, Coppertone Sport SPF 50 did not give the best protection against UV rays. Surprisingly, it has the same active ingredients as the Walgreens with Parsol 1789 SPF 50. A major difference between the two is an inactive ingredient in the Walgreens sunscreen, aluminum starch octenylsuccinate. This inactive ingredient has been shown to increase SPF in sunscreens. The results and research suggest that sunscreens are not equal in performance. Both active and inactive ingredients affect UV protection. This project could be used to help people find a low cost, effective sunscreen.</p>	
Summary Statement The purpose of my project was to investigate whether the brand of sunscreen and its ingredients affected the amount of UV rays blocked.	
Help Received Parents helped purchase materials for the project.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Kristen H. Mizutani	Project Number J2224
Project Title Automobile Window Tinting: Impacts on UV Penetration	
Abstract Objectives/Goals The goal of the project was to evaluate the relationship between the degree of tinting on a car window and transmission of harmful ultraviolet light (UVA or UVB). A secondary goal was to evaluate the effect of the location of the window (driver versus rear passenger) on the transmission of harmful UVA and UVB. My hypothesis was that tinted car windows would significantly reduce UVA transmission compared to ordinary windows. Methods/Materials I utilized two ways of measuring UVA and UVB light. UV beads (there are many sources for UV beads) can be used to estimate far UV light. These originally colorless beads change color with exposure to UV light. However, it is unknown the relationship between the color changes and the amount of UVA light or UVB light causing the change. Therefore, I employed a UVA meter (National Biological Corporation model #UVA-400C) and a UVB meter (National Biological Corporation model #UVB-500C) to measure UV transmission. Results All 112 windows in 28 automobiles had UVB meter readings of 0mW/cm ² . The mean direct sunlight UVB meter reading (control) was 0.13mW/cm ² . Results revealed that the driver's side window (tempered glass) allowed the highest transmission of UVA with a mean of 1.24 mW/cm ² (std. dev. = 0.45) compared to front laminated windshields with UVA meter readings of 0mW/cm ² in all 28 cars. Direct sunlight (control) had a mean UVA meter reading of 10.74 mW/cm ² . I found that different degrees of tint resulted in varying UVA transmissions. Light tint had a mean UVA transmission of 0.57mW/cm ² (std. dev.= 0.14). Medium tint had a mean UVA of 0.33 mW/cm ² (std. dev. = 0.14). The darkest tint had a mean UVA reading of 0.16 mW/cm ² (std. dev. = 0.08). Through performing this experiment, I also found a correlation between specific color changes of UV detecting beads and specific transmission of UVA. Conclusions/Discussion I documented an inverse relationship between UVA light transmission and the amount of tint in a car window. The darkest tint almost completely blocked UVA transmission. I found the least protective window was located on the driver's left side. A study I read said that photoaging of the skin and premalignant skin cancers are more common on the side of the face nearest the driver's left side window.	
Summary Statement The goal of my project was to evaluate the relationship between the degree of tinting on a car window and transmission of UVA or UVB light, and also to correlate UV detecting bead colors to specific transmission of UVA.	
Help Received Thanks to my parents, who drove me to automobile lots to perform my tests. Thanks to the Lexus dealership for allowing me to test their cars. Thanks to my science teacher for her guidance.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Todd A. Nugent	Project Number J2225
Project Title "Punked" at the Pump: Are You Getting the Most Bang for Your Buck When You Buy a Gallon of Gas?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals With gas prices on the rise, and consumer confidence at an all time low, I felt it was important to find out if we are getting what we pay for at the gas pump. My research showed that it is harder for independent gas stations to make a profit compared to corporate owned station. My hypothesis speculates that independent stations, on average, take advantage of allowable variances in a gallon of gas. My goal is to pay for exactly one gallon of gas as my control. I will test 20 pumps at local stations; 10 independent and 10 corporate. I will measure weight, height, the temperature of the gas, the temperature of the outside air, and the time of day sampled which plays affecter in my experiment. My objective is to accurately test my hypothesis through comparative sampling.</p> <p>Methods/Materials Method: Arrive at gas Pump Island at exact same time and record time and temperature. Take picture of advertised price and picture of station. Record information of station (I.E. Name, Address, Phone). Grab petty cash out of pouch. Go into the gas station and pay for exactly one gallon of gas for pump one and ask for receipt. Put receipt in petty cash pouch. Return to gas pump. Take a picture of gas pump before pumping. Put gloves on before pumping. Place gas can on the ground. Pump exactly one gallon of gas at gas pump. Mark with a sharpie to indicate pump and can relation. Take a picture of the pump after gas has been received. Weigh on digital scale. Record results. Materials: Thermometer, cell phone (Satellite Watch), digital camera, digital scale, four one gallon plastic gasoline containers, petty cash, marker, scotch tape, pen, notebook, pencil, car, gas pump.</p> <p>Results My results did not prove my hypothesis. In fact, in my test group the independent stations dispensed slightly more gas, on average, than corporate stations. Although the other variables in my test were calculated, graphed, and recorded, they did not seem to have a large enough impact on the results to be note worthy.</p> <p>Conclusions/Discussion My test group showed that gas pumps are accurate most of the time and dispense gas within the allowable ranges set by the department of weights and measures. Independent or corporate ownership does not seem to be a factor at this time. This is not to say that regular inspection should not be carried out.</p>	
Summary Statement My project compared corporate and independent gas pumps to determine whether there was a detectable trend in the accuracy in the amount of gas dispensed.	
Help Received Department of Weights and Measures checked my equipment for calibration. Dad helped type report. Parents supervised testing.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Mia Ramos	Project Number J2226
Project Title A Matter of Megapixels	
Objectives/Goals The purpose of my project is to determine if the megapixel count in a digital camera affects the print quality of a 4x6 inch glossy print.	
Abstract Methods/Materials Five cameras with different megapixel counts were collected. All the cameras' settings were set the same - all auto since that is what most people use. Seven photographs were taken with each camera, five outdoors, and two indoors - one with flash, one without. All photos were downloaded to a computer and printed on glossy 4x6 photo paper using the same software and printer, (no editing involved). The photographs were then compared - looking at color, sharpness, highlights, shadows, and digital noise. Conclusions were made.	
Results There was a slight improvement in quality from the 2.2 megapixel camera to the 8 megapixel camera; with a slight dip in the graph for the five megapixel camera.	
Conclusions/Discussion When I graphed my results I proved my hypothesis correct, which was that more megapixels in a camera would give better prints; though there was only a slight difference in my results. That slight difference might have been due to the fact that in the two megapixel camera there are only 2 million pieces of information but in the eight megapixel camera there are 8 million pieces of information in the same area. That is probably why the two and three megapixel cameras had lower scores than the six and eight megapixel cameras. In my results there is a dip in the graph for the five megapixel camera. This may be because the computer in the camera lacks power or maybe it could be because of a lower quality sensor, or lens.	
Summary Statement Does the megapixel count in a digital camera affect the print quality of a 4x6 glossy print?	
Help Received Mother helped type report; friends loaned me the cameras	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Ninett R. Rodriguez	Project Number J2227
Project Title Watch Out for Lead	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals People don't always realize that the pots and pans that they use to cook with every day might be containing lead. This project looks at the safety of cooking with a ceramic pot. The safety was tested by boiling water in different ceramic pots that did contain lead (the pots were tested for lead earlier). After the water was boiled, it was put in a special container where a formula was added to determine whether or not the water tested positive on lead. My hypothesis was that if I boiled water in the ceramics, then the lead would leak in.</p> <p>Methods/Materials MATERIALS: Dropper; Three ceramic pots; 10 lead testing swabs; Lead testing in Water kit: Dissolving tablet, Glass bottle, Testing strip, Carrier solution.</p> <p>METHODS: First prepare all materials necessary for the project. Then take one of the pots and wipe the testing swabs across it. (Repeat with all of the ceramics). Next fill the ceramics that tested positive for lead with water (about three quarters). Then heat the water at 140° F or 60° C. Once the water is heated up, let it sit for two hours undisturbed. Pour the water (that is now at room temperature) into the testing bottle. Add the dissolving tablet into the bottle and shake vigorously. Add the carrier solution to the formula and let sit undisturbed for ten minutes. Insert Test strip to the top of bottle and wait for a pink line to appear through it. Then use a lead check swab to find out if the water had led in it.</p> <p>Results When I tested the ceramics containing lead for additives the results were negative. The lead in the cooking pots (which were previously proven to have been to contain lead) did not leak into the water, when a temperature of 100 degrees celsius was reached. The results did not support my hypothesis.</p> <p>Conclusions/Discussion In this experiment, my hypothesis was proven wrong. I thought that when heating water at a boiling temperature in a ceramic cooking pot containing lead, the lead in the pot would extract from the surface realising the harmful chemical into the water. In conclusion, the results for my experiment prove that it is safe to heat up water in ceramic cooking pots even when high temperatures are reached. Lead is something that people should be more aware of because it is something that is known to be very hazardous to your health. And now lead in water that you heat up yourself in a ceramic pot is something less to worry about.</p>	
Summary Statement My project is about searching for lead in ceramic cooking pots.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Beth A. Rosenberg	Project Number J2228
Project Title Cardboard: It's Just Not for Breakfast Anymore	
Objectives/Goals I wondered how a food's Calories compares to the Calories of its food container, such as Fritos vs. the Fritos bag. I also wondered if the Calories per serving on the foods' Nutritional Facts Label were accurate. I hypothesize that food has more Calories than its container, and the Nutritional Facts Labels are accurate.	
Abstract Methods/Materials I built a homemade calorimeter to measure the heat released from the food and container samples when burned. The heat released was captured by a can filled with a measured amount of water located above the burning object. I weighed a small piece of the food and its container before and after I separately burned them. I also measured the water temperature before and after the burning. Using these measurements, I calculated the object's calories. I tested each item (food and containers) at least three times.	
Results Food vs. Container: 7 of the 8 containers tested had at least 32% more Calories than the food it contained. 5 containers had over 60% more Calories. Accuracy of the Nutritional Facts Labels: All of the Nutritional Facts Labels listed at least 36% more Calories per serving than the food I tested.	
Conclusions/Discussion My hypothesis about food Calories vs. container Calories was incorrect. My calorimeter gave very consistent data results for each of the 8 food items and 8 food containers I tested. Only one food item had slightly more Calories than its container, Fiber One Cereal which is high in dietary fiber (cellulose), just like its cardboard box (this must explain why Fiber One tastes like cardboard). My research indicates that we may someday be able to convert food containers into animal feed and bio-fuel. While my hypothesis about the Nutritional Facts Label accuracy appears incorrect, my calorimeter allowed for too much heat loss which gave me inaccurate (too low) food Calorie readings. Therefore, I believe my test results were inconclusive to either prove or disprove my hypothesis.	
Summary Statement I compared the Calories in food to the Calories in its food container and I tested the accuracy of the Calories per serving noted on the Nutritional Facts Labels.	
Help Received Dad helped me with graphs, charts, spreadsheets and making sure I didn't burn down the house. Mom helped me with the display board and proofreading everything.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Vincent T. Sciacca	Project Number J2229
Project Title Ear Protection and Noise-Induced Hearing Loss	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to determine which ear protection device will provide the greatest noise reduction over different frequencies tested. I believe that Hearos earplugs will produce the greatest noise reduction because it has the highest NRR (noise reduction rating) of all brands tested.</p> <p>Methods/Materials I selected five brands of earplugs for testing. I used a styrofoam mannequin head with holes drilled from ear to ear to hold an earplug on one side and a sound level meter on the other. An electronic keyboard was used to create three different sound frequencies. Multiple readings were taken and recorded for the control (without earplugs) and for each brand of earplugs at each frequency tested.</p> <p>Results The results showed that Mack's earplugs produced the greatest sound reduction for all frequencies tested. It reduced decibel levels by 10.7% at the higher frequency, 3.6% at the middle frequency, and 6.1% at the lower frequency. Quiet Time finished second, with Hearos and Quiet!Please tied for third. EarPlanes finished in last place. The order of finish was the same across all three sound frequencies tested.</p> <p>Conclusions/Discussion Mack's earplugs were the most effective at reducing sound levels at all frequencies tested. The data did not support my hypothesis because Hearos had the highest NRR but tied for third. My theory is that Mack's was the most effective because it formed a tighter seal and blocked more sound waves from entering the ear. These results may be different from testing on a human ear compared to styrofoam, which is more difficult to get a proper seal. Ear protection is important to consider in situations with excessive noise because noise-induced hearing loss can be permanent, but is also 100% preventable.</p>	
Summary Statement This project is to determine which ear protection device will produce the greatest sound reduction over different frequencies tested.	
Help Received Father drilled holes in styrofoam mannequin head and assisted me during the experiment; Mother helped with board set-up.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Emily M. Spencer	Project Number J2230
Project Title Thermal Insulation Comparison of Sleeping Bag and Blanket Combinations	
Abstract Objectives/Goals My objective was to see how much a sleeping bag's temperature rating and the type of blanket that a person uses while camping effects the amount of heat transfer that takes place. Methods/Materials Three forty-five degree Fahrenheit rated sleeping bags, a thirty degree farenieght sleeping bag, a fifteen degree farenieght bag, a zero degree fareneight bag, a reflective blanket, and a traditional blanket were used in the experiment. One of the forty-five degree farenieght rated sleeping bags was wrapped in a reflective blanket while another forty five degree bag was wrapped in the more traditional blanket. Then three gallon jugs of water at about human temperature were placed in each sleeping bag. A cooking thermometer was used to check the temperature of the water in each gallon throughout the night. Results When comparing the heat transfer with a sleeping bag's rating, the sleeping bag with the lowest temperature rating was the best insulator. When comparing the type of blankets, the more traditional blanket was a better insulator then the reflective blanket. Conclusions/Discussion My conclusion is that a sleeping bag with a lower temperature rating is a better insulator then a bag with a higher temperature rating. In this experiment, the traditional blanket was a better insulator then the reflective blanket. However, considering the reflective blanket's thickness and weight to that of the traditional blanket, the reflective blanket was a better insulator for its weight.	
Summary Statement My experiment is on the relationship of heat loss with sleeping bag temperature ratings and blankets.	
Help Received Mother helped with board and report; Father helped with report and conducting the experiment	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Nolan T. Stephens	Project Number J2231
Project Title The Relationship of SPF and UV Protection	
Abstract Objectives/Goals To find a SPF level where the protection provided starts to level off. This will educate others about a safe SPF rating that will protect their skin against harmful UV rays. Methods/Materials Three separate SPF's of sunscreen were utilized: 15, 30 & 50 SPF sunscreen. Hotdogs acted as the human skin. The hotdogs were lathered up with the three types of sunscreen. A fourth group of hotdogs without protection was included to easily determine how much protection the separate SPF's of sunscreen actually provided. These groups of hotdogs were placed into four separate sections labeled with sharpie on a jelly roll pan covered with foil. The hotdogs were set out in the sun for an extended period of time, 7 hours. Each hour the hotdogs were examined, temperature was taken; observations and pictures were also recorded. Results Overtime there was a color and burn difference between each of the four groups. Each SPF provided slightly more protection over the hours. The 30 & 50 SPF sunscreens provided approximately the same amount of protection for the 7 hour period. They were very close! Conclusions/Discussion The different SPF levels of sunscreen have a corresponding difference of protection but the higher SPF levels did not provide a significant difference in protection over the 30 SPF sunscreen. From this knowledge gained, one can infer that 30 SPF is the lowest SPF sunscreen needed for the best protection over a seven hour period.	
Summary Statement This experiment provided valid and useful information to people here in southern California by informing them which SPF of sunscreen provides the best protection over an extended period of time.	
Help Received A series of questions answered by Dr. Jim Pettit	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Christopher J. Wang	Project Number J2232
Project Title Tennis Ball Bounciness Experiment: Does the Brand of Tennis Ball Affect How Bouncy It Is?	
Objectives/Goals I love playing tennis! In a tennis game, tennis balls are an important element. I want to find out which balls are bounciest. Of all of the balls I tested, I believe Wilson balls will be the bounciest. Based on my research, a tennis ball will bounce higher or lower depending on the amount of pressure it has. The Wilson balls have the most pressure when I squeeze them and are recommended for hard surfaces. They could be made of thicker material and air pressure in the ball would seep out slower and stay high for a longer period of time. In my experiment, I will shoot the ball against a wall many times. I don't believe that the balls will lose pressure that quickly. That is why I formed my hypothesis that Wilson balls would be the bounciest.	
Abstract Methods/Materials Using a home-made machine with rubber bands tied to the back of a chair, I launched tennis balls at a concrete wall. This wall will serve as my racket in my experiment. A layer of sand was placed in front of the wall. Every time the tennis ball landed on the sand and left a mark, I would measure the distance. In a tennis game, once the ball is hit by the opponent's racket, and it bounces twice, the ball is out of play. That is why the distance on the second bounce is measured. The variable in my experiment is the brand of tennis ball. Five brands of balls were tested and five trials of each ball were averaged and compared. As a total, I had 15 trials for each brand of tennis ball. Material list: homemade rubber-bands-tied-to-a-chair ball launcher, tennis balls, concrete wall, plastic trash bags, sand, duct tape, measuring tape, camera, paper.	
Results I tested three balls of each brand, and five times for each ball. All of the tested data was tabulated. The average distance traveled by each ball was calculated. Then, the three balls of each brand were averaged for all the trials and balls. The Head balls traveled an average of 408.7 centimeters and Wilson balls 362.4 centimeters.	
Conclusions/Discussion Before the experiment, I thought the Wilson brand would be the bounciest. However, I found out that the Head balls actually were the bounciest. They traveled an average of 408.7 centimeters. Wilson balls, the least bouncy, only traveled 362.4 centimeters. I believe that the Head balls traveled the farthest because they had less fuzz which generates less wind resistance. Also, having less fuzz made it less likely to catch onto the rubber bands of the launching machine.	
Summary Statement To test the bounciness of different brands of tennis balls, a homemade tennis ball launcher was used to shoot balls at a wall and the distance the ball traveled away from the wall on the second bounce was measured and compared.	
Help Received Father helped hold chair down to launch balls during experiment; Mother helped take some pictures; Brother fetched balls.	



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Jonathan S. Wegleitner	Project Number J2233
Project Title Handle with Care: Testing the Effectiveness of Different Packaging	
Abstract Objectives/Goals To test the level of protection that different packaging materials offer Methods/Materials Materials: 240 full, unopened 12 oz. soda cans, 10 corrugated card board boxes the same size and thickness (10½ feet by 5 feet by 10½ feet), Bubble wrap, Foam Packing Peanuts, Newspaper, A metric ruler, Packaging tape, A pen, A notebook to record observations Procedure: Put one kind of packaging material in the box (bubble wrap, packing peanuts, newspaper, nothing-control). Put two unopened soda cans into the box and surround each with packaging material. Tape the box shut. Put the box on a platform one, two or four meters high. Push the box lightly off the object onto concrete at the same spot. Open the box and inspect any damage done to the cans. Record the results and organize the cans according to the conditions of the cans for further comparison. Finally repeat steps 1-8 until you have tested each packaging material at each height ten times. Results Packing materials have the same effectiveness up to two meters, but bubble wrap, on average, protected items better than foam peanuts or newspaper at four meters. During my experiment sometimes the boxes bounced. Most of the time when the boxes bounced there was more damage to the two cans inside because they collided. If you want to ship multiple items you must protect them from outside forces but you must also protect them from each other. Sometimes one can in the box was damaged while the other can was not damaged. This shows that damage can occur internally as well as externally. Conclusions/Discussion Bubble wrap was the most effective packaging material at higher levels because the bubbles absorbed the force better. Other packaging materials protected the items inside, but they allowed them to shift a little more. At one meter, which is near the height of a loading dock, all three packaging materials performed well. At two and four meters nothing was perfectly protected. Also, if you ship a light object such as a light bulb, which has less mass, dropping it off a great height would not break it because the corrugated box is enough protection. Packaging for light items is there to protect against forces such as vibration or shaking. However when shipping an object with more mass, packaging is important to protect the item from deforming during impact.	
Summary Statement To test the effectiveness of different packaging materials.	
Help Received My dad drove me to get my materials.	